California Morbidity

Department of Health Services
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Foodborne Diseases Active Surveillance Network (FoodNet), California Site 1996-1998

Approximately 76 million cases of foodborne illness occur each year in the United States (1). The Foodborne Diseases Active Surveillance Network (FoodNet), established in 1996, is a collaborative project among the Centers for Disease Control and Prevention (CDC), the U.S. Department of Agriculture, the U.S. Food and Drug Administration, and seven FoodNet sites. FoodNet sites cover eight percent of the U.S. population and include the states of Connecticut, Oregon, and Minnesota and selected counties in Georgia, Maryland, New York, and California (Alameda and San Francisco).

FoodNet focuses on illnesses caused by the bacterial pathogens *Campylobacter*, *E. coli* O157:H7 and other shiga-toxin producing *E. coli*, *Listeria*, *Salmonella*, *Shigella*, *Vibrio*, and *Yersinia*, and the parasitic pathogens *Cryptosporidium* and *Cyclospora*. The three main objectives of FoodNet are: 1) to describe the epidemiology of infectious foodborne diseases, 2) to determine more precisely the burden of selected foodborne diseases, and 3) to determine the proportion of foodborne illness attributable to specific foods.

The comprehensive active surveillance system is used to describe the epidemiology of foodborne diseases. Analyses of both national and local FoodNet surveillance data have revealed a number of interesting patterns and trends. For example, Figure 1 shows the number of cases of the three most commonly isolated enteric pathogens in California by month for 1996-1998. Seasonal trends, with peak rates in the summer months, are seen in *ampylobacter*, *Salmonella,* and *Shigella* infections. In 1998, the rates for enteric pathogens tended to be higher in San Francisco and Alameda Counties than in all other sites combined, as indicated in Figures 2A and 2B. San Francisco County has high rates for all pathogens except *E. coli* O157:H7 and *Listeria*, and has particularly high rates for *Campylobacter*, *Shigella,* and *Vibrio*.

Figure 1: California FoodNet Site, Selected Pathogens by Month, 1996-1998
Source: Department of Health Services

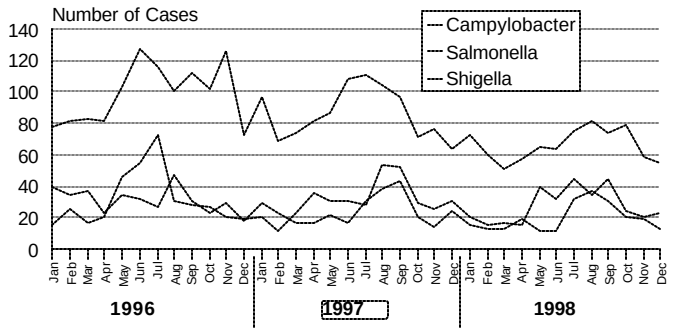

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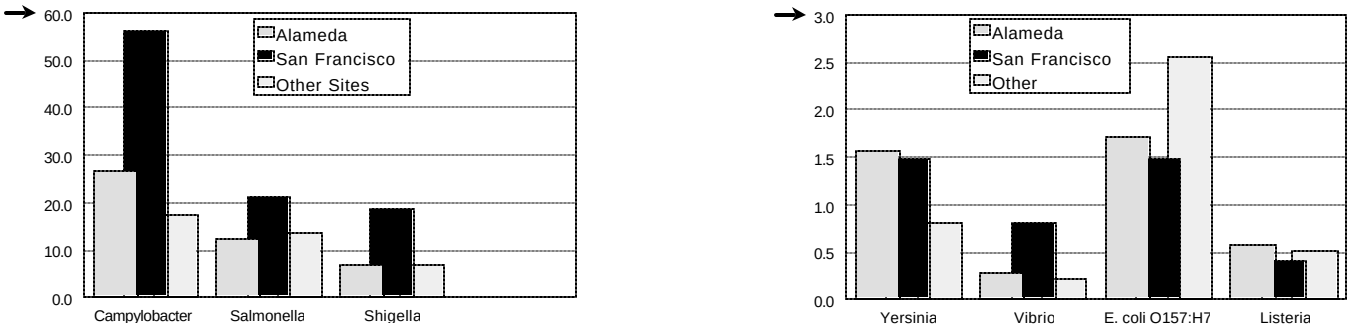
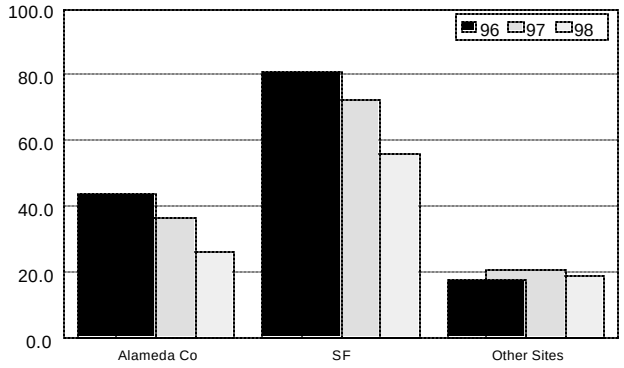
Figure 2A and 2B: Rate of FoodNet Bacterial Pathogens, California Counties and Other Sites, 1996-1998
Source: Department of Health Services



Campylobacter was the most frequently diagnosed pathogen both nationally and in California. The rates in San Francisco (56.0 cases per 100,000 population) and Alameda (26.6 per 100,000 population) are remarkably high. Figure 3 shows that San Francisco and Alameda Counties have had high *Campylobacter* rates for the past three years, but unlike the other sites, the rates have clearly been decreasing.

Figure 3: Campylobacter Rate by Region and Year, FoodNet 1996-1998.
Source: Department of Health Services

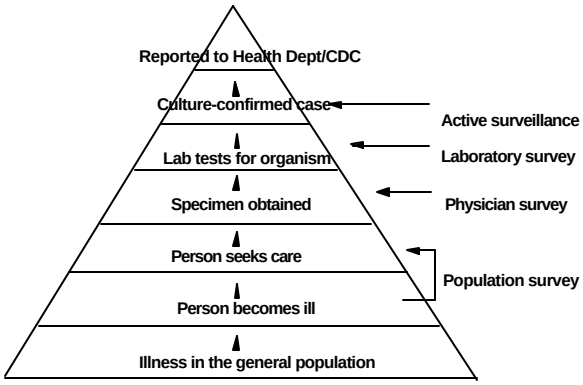


Determining the burden of foodborne illness, objective number two, is challenging because cases that are reported to the public health system represent only the tip of the iceberg. For a case to be reported: 1) a person must seek medical care for symptoms related to a foodborne illness, 2) the physician must request a specimen for testing, 3) the laboratory must test appropriately for the causative bacterium, and once a pathogen is identified, 4) it must be reported.

FoodNet is using a pyramid model to examine all aspects of this iceberg (Figure 4): a population based survey of eating habits, food handling practices, diarrheal illness, and resultant medical consultation; a physician survey to determine physicians' stool culturing practices; a laboratory survey to look at laboratory stool culturing policies, and practices; and active surveillance for all cases identified by laboratories in the catchment area. For example, preliminary results from this effort indicate that although 369 cases of *Salmonella* infection were reported in the California catchment area in 1997, a total of 14,022 infections are estimated to have occurred but were either undetected or not reported (1).

Figure 4: FoodNet Burden of Disease Pyramid
Source: Centers for Disease Control and Prevention/National Center for Infectious Disease/Division of Bacterial and Mycotic Diseases

Figure 6: FoodNet Burden of Disease Pyramid



The third objective of FoodNet is to estimate the risk of foodborne illnesses associated with eating specific foods. Since its initiation, FoodNet has completed three case-control studies for *Salmonella*, *E. coli* O157:H7, and most recently *Campylobacter*. These projects are beginning to yield significant results. For example, the case-control study on sporadic *E. coli* O157:H7 infections demonstrated that consumption of pink hamburgers is a risk factor for infection and that regional differences in the rate of *E. coli* O157:H7 infections may be related to exposure to *E. coli* O157:H7 through living on or visiting a farm (3). A revised case-control study of E. coli O157:H7 is currently being conducted and a case-control study of Listeriosis will begin in 2000.

In addition to work on national activities, the California FoodNet site is involved with several local projects. Because incidence rates of *Campylobacter* are high in California among Asian and Hispanic children, the California FoodNet site is now conducting a case-control study examining risk factors which are specific to these populations. Surveys for this study are conducted in English, Spanish, Cantonese or Mandarin. California FoodNet is also conducting a *Shigella* case-control study among adults living in San Francisco, which will assess risk factors for infection in this population. FoodNet also works with the health departments of San Francisco and Alameda Counties and the City of Berkeley on outbreak investigations and is developing a system to monitor potential foodborne outbreaks based on complaints reported by the public.

In conclusion, active surveillance, physician surveys, population surveys, and laboratory surveys conducted in FoodNet sites are improving both the estimate of the burden of foodborne disease and the understanding of the epidemiology of infections with *Campylobacter*, *E. coli* O157:H7, *Listeria*, *Salmonella*, *Shigella*, *Yersinia*, and *Vibrio*. Case-control studies are yielding insight into what food practices put people at risk for infection. These efforts along with other FoodNet projects are improving our understanding of foodborne disease and will help the department to improve foodborne disease prevention activities.

References:

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2. Foodborne and Diarrheal Diseases Branch, Division of Bacterial and Mycotic Diseases. FoodNet: What We Are, Where We Are, and What We're Doing in 1998. The Catchment Fall 1998;1;1.
3. Kassenborg H, Hedberg C, Evans M, et al. Case-control study of sporadic Escherichia coli O157:H7 infections in five FoodNet sites (CA, CT, GA, MN, OR). Abstract presented at International Conference on Emerging Infectious Diseases, Atlanta, Georgia, March 8-11, 1998.

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Editor note: The California Morbidity Report's editorial committee has received the suggestion to change the name of the CMR. We welcome your comments and suggestions and invite you to send them to the California Morbidity Editorial Committee c/o DCDCCM@dhs.ca.gov.
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